ASCE STANDARD

ASCE/SEI

7-22

Minimum Design Loads and Associated Criteria for Buildings and Other Structures

PROVISIONS

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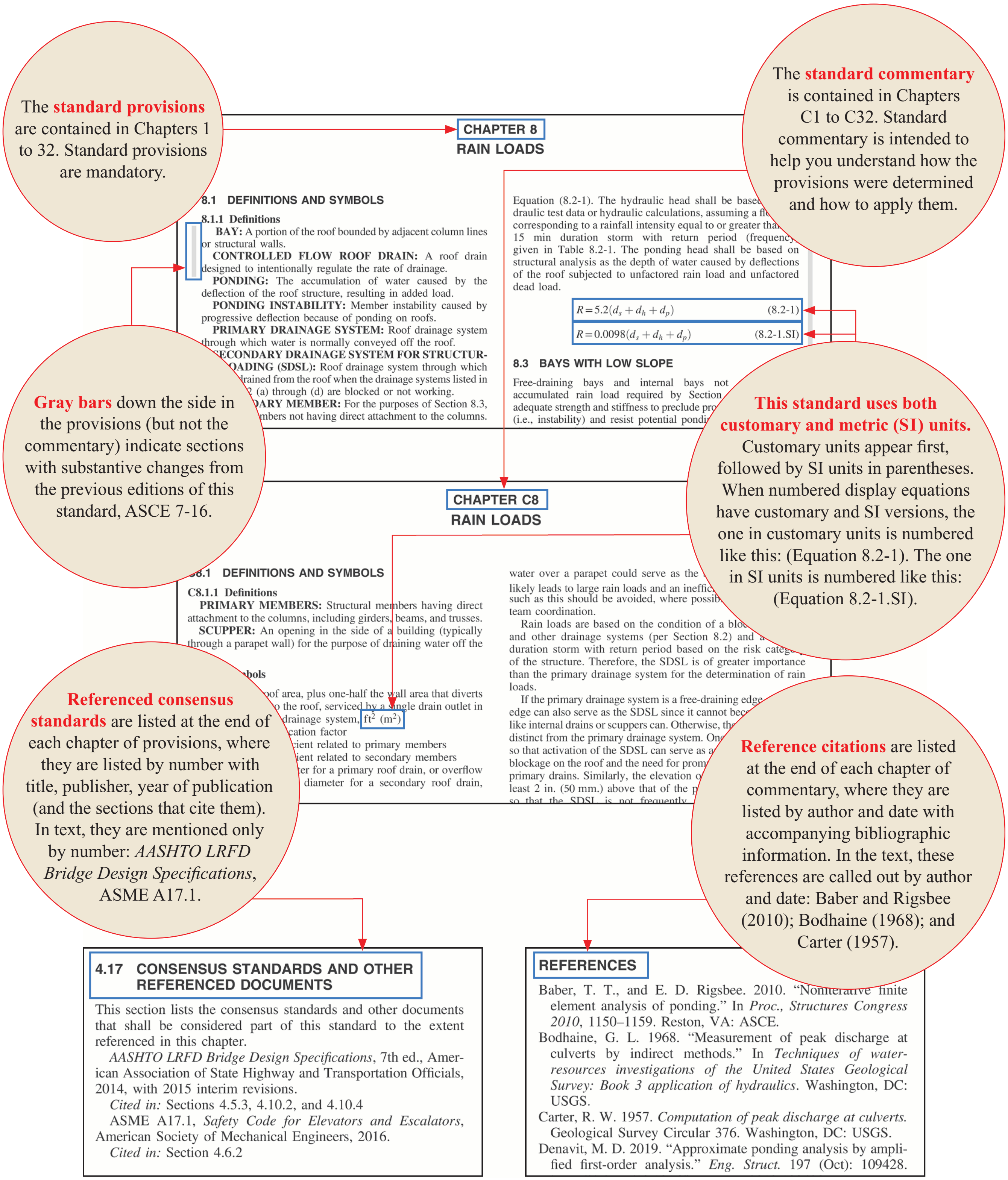


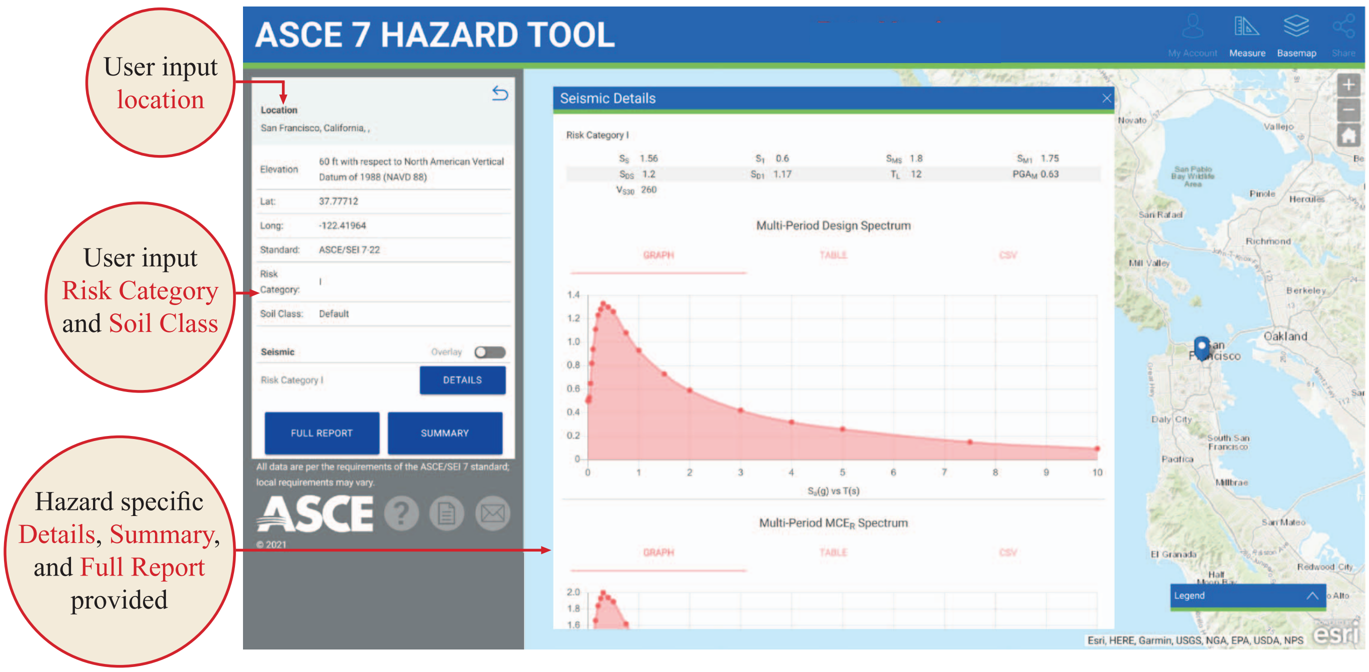
Complete hazard data in ASCE 7-22 is provided free to the user in the ASCE 7 Hazard Tool (https://asce7hazardtool.online/). See next page for more details.

Supplements, errata, and interpretations may become available in the future. Please check for important new materials at https://doi.org/10.1061/9780784415788.

Tips for Using the ASCE 7 Hazard Tool

asce7hazardtool.online

The ASCE 7 Hazard Tool provides access to the digital data defined in the hazard Geodatabases required by this standard. The digital data required for snow, seismic, and tornado are available at https://asce7hazardtool.online/, and digital data is available for flood, rain, ice, and wind, as well. Digital data required for tsunami is available at https://asce7tsunami.online/.



Digital Data

The ASCE 7 Hazard Tool provides digital data required by ASCE 7-22:

- Ch. 5 Flood: Flood zone and static base flood elevation, plus direct links to additional information
- Ch. 6 Tsunami: Whether the site is in a mapped tsunami design zone per the ASCE Tsunami Design Geodatabase, and link to ASCE Tsunami Design Geodatabase if required for design
- Ch. 7 Snow: Ground snow load and winter wind parameter
- Ch. 8 Rain: Median 15-minute and 60-minute duration rainfall intensities for 100-year mean recurrence interval
- Ch. 10 Ice: Radial ice thickness with concurrent 3-second gust speeds and temperature concurrent with ice thickness due to freezing rain
- Ch. 22 Seismic: Seismic coefficients S_S, S_1, S_{MS}, S_{M1}, S_{DS}, S_{D1}, T_L, PGA_M, and V_{S30}, plus the seismic design category, as well as the multi-period spectrum, the multi-period MCE_R spectrum, the two-period design spectrum, and the two-period MCE_R spectrum
- Ch. 26 Wind: Three-second gust wind speeds at 33 feet (10 meters) above ground for Exposure Category C, including identification of hurricane-prone and wind-borne debris regions
- Ch. 32 Tornado: Tornado wind speeds for 1,700-, 3,000-, 10,000-, 100,000-, 1,000,000-, and 10,000,000-year MRI, and for 1-, 2,000-, 10,000-, 40,000-, 100,000-, 250,000-, 1,000,000-, and 4,000,000-ft_2. target areas

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COMMENTARY TO STANDARD ASCE/SEI 7-22

Commentary contents appear in second book

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Minimum Design Loads and Associated Criteria for Buildings and Other Structures

PREFACE

Prepared by the Minimum Design Loads and Associated Criteria for Buildings and Other Structures Standards Committee of the Codes and Standards Activity Division of the Structural Engineering Institute of ASCE

ASCE/SEI 7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures provides the most up-to-date and coordinated loading provisions for general structural design. ASCE 7-22 prescribes design loads for all hazards including dead, live, soil, flood, tsunami, snow, rain, atmospheric ice, seismic, wind, and fire, as well as how to evaluate load combinations. The 2022 edition of ASCE 7, which supersedes ASCE 7-16, coordinates with the most current structural material standards including those from ACI, AISC, AISI, AWC, and TMS.

Significant technical changes include the following:

- General Requirements
  - New target reliability tables for tsunami and extraordinary loads
  - Removal of importance factors for snow and ice due to risk category specific maps being provided
  - Expanded provisions for in situ load testing
- Load Combinations
  - Revised load combinations to reflect changes in snow loads and new tornado loads
  - New alternative method for loads from water in soil
  - Load combinations for flood loads and atmospheric ice are now explicitly written out and numbered for improved reference and clarity
- Dead and Live Loads
  - Reformatted lateral soil loads table for improved clarity
  - New alternative method for loads from water in soil
  - Terminology change from guardrail system to guard system
  - Additions and clarifications to the live load table
  - Updated crane load vertical impact force provisions including the use of bridge crane service classes
  - New provisions for emergency vehicle loads
- Tsunami Loads and Effects
  - Clarification for inundation calculations for overwashed areas
  - Updated data for Hawaii and many populous locations in California, coordinated with the state agencies
  - New provisions for above-ground horizontal pipelines
  - Clarifications and new provisions for debris impact analysis
  - New provisions for loss of foundation strength and scour
- Snow Loads
  - Ground snow loads have been revised to reflect more recent snow load data and reliability-targeted values
  - Method for estimating drifts revised to include a wind parameter
  - A more accurate estimation of the horizontal extent of windward drifts
  - Revised thermal factors to account current trends in roof insulation and venting
- Rain Loads
  - Design rain load revised to explicitly consider a ponding head
  - New commentary for low slope roofs and drainage to existing roofs
- Atmospheric Ice Loads
  - New risk-targeted atmospheric ice load data for the continental United States and Alaska
- Seismic Design
  - Multi-period response spectrum data eliminates need for F_a and F_v coefficients
  - Increase in number of site class definitions
  - Updated provisions for two-stage analysis procedures
  - Updated provisions for calculating torsion impacts, including irregularities (new Torsional Irregularity Ratio (TIR) term] and accidental torsion
  - Updated directional loading provisions
  - Updated analysis procedure selection provisions
  - Updated displacement and drift provisions
  - Updated force equations for nonstructural components
  - New provisions for penthouses and equipment and distribution system support structures
  - New Lateral Force Resisting Systems:
    - Steel and Concrete Coupled Composite Plate Shear Walls
    - Reinforced Concrete Ductile Coupled Shear Walls
    - Cross-laminated Timber Shear Walls
    - Concrete Tabletop Structures
  - New provisions for Rigid Wall, Flexible Diaphragm buildings (big box stores/warehouses)
  - New and updated provisions for supported and interconnected (coupled) nonbuilding structures
- Wind Design
  - Updates to the wind speed maps along hurricane coastline
  - Removal of tabular methods for both the directional and the envelope procedures, and C&C
  - New provisions for MWFRS and C&C of elevated buildings
  - Updated and expanded provisions for roof and ground-mounted solar
  - Updated provisions grouped circular bins and tanks
  - Revisions to the (GC_p) graphs for external pressure coefficients on C&C
  - Updates for wind tunnel testing and adoption of new edition of ASCE 49-22
  - New chapter for tornado provisions
  - New long return period hazard maps for wind and tornado
- Digital Data Available for all Hazards
  - Required to use digital data for tsunami, snow, seismic
  - Provided for flood, rain, ice, wind, tornado

In addition to the technical changes, the 2022 edition of the ASCE 7 provisions are accompanied by a detailed commentary with explanatory and supplementary information developed to assist users of the standard, including design practitioners, building code committees, and regulatory authorities.

ASCE 7 is an integral part of building codes in the United States and around the globe and is adopted by reference into the International Building Code, International Existing Building Code, International Residential Code, and NFPA 5000 Building Construction and Safety Code. Structural engineers, architects, and those engaged in preparing and administering local building codes will find the structural load requirements essential to their practice.

ACKNOWLEDGMENTS

The American Society of Civil Engineers (ASCE) acknowledges the work of the Minimum Design Loads and Associated Criteria for Buildings and Other Structures Standards Committee of the Codes and Standards Activities Division of the Structural Engineering Institute. This group comprises individuals from many backgrounds, including consulting engineering, research, construction industry, education, government, design, and private practice.

This revision of the standard began in 2017 and incorporates information as described in the preface. This standard was prepared through the consensus standards process by balloting in compliance with procedures of ASCE's Codes and Standards Activities Committee. The individuals who serve on the Standards Committee are listed as follows.

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Jon A. Peterka, Ph.D., P.E.

May 26, 1941 – May 22, 2019

ASCE 7-22 is dedicated to Dr. Jon A Peterka, P.E., a leader in the development of codes and standards for ASCE who served on the ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures committee for several decades and was relied on for thoughtful guidance as the ASCE 7 wind load provisions evolved. Jon was a pioneer and community pillar of wind engineering. He was instrumental in the writing of the first version of ASCE 49 *Wind Tunnel Testing for Buildings and Other Structures* (and its antecedent, ASCE Manual of Practice 67). This service to our profession was only the tip of the iceberg in his passion for his work. Jon's imprint can be found throughout this standard, certainly in the knowledge and methods he contributed but also in the spirit in which we strive to provide the information necessary to improve the transparency, consistency, and quality of wind load provisions and wind tunnel testing.